Food Security in the Southern Mediterranean/North Africa

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Abstract The Southern Mediterranean, comprising the five countries of North Africa, has become increasingly dependent on food imports over the past few decades. High levels of population growth, a variable and arid climate along with scarce and fragile resources are contributing factors. Volatile food prices and political changes in the past few years have exacerbated the problems related to food import dependence, threatening food security. Addressing food security will require sustainable improvement of productivity, better management of natural resources, improved allocation of private and public resources to agriculture, and actions to achieve more inclusive, integrated, and efficient food systems.

1 Introduction

Throughout history, the southern Mediterranean has been a major food producing region, and during the first and second centuries, the region is said to have provided a large portion of the food consumption in Rome (Kehoe 1988; Rickman 1980). During the sixteenth century, grains, rice, and legumes such as fava beans and chickpeas were exported from Egypt through the Nile across the Mediterranean. The Mediterranean has never been a region of abundance and glut, but it has adapted skillfully to circumvent its deficiencies in production (Braudel 1990). Over time, a combination of climatic and environmental changes, population growth and changes in the political and economic environment have transformed the region into one that is highly dependent on imports to satisfy its basic food needs, particularly in cereals.[1]

The five countries of the Southern Mediterranean[2] (hereafter SM) cover an area of 5.8 million km^2—almost 68 % of the total area of the Mediterranean basin

The views expressed in this chapter are those of the author and do not necessarily reflect the views or policies of FAO.

[1] For more on the environmental history of the region, see Davis 2007 (pp. 1–15).

[2] Algeria, Egypt, Libya, Morocco, and Tunisia.

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Table 1 Population (in millions) in the Mediterranean (1960–2012)

	2012		1960		Change 1960–2012 (%)	
	Total	Rural	Total	Rural	Total	Rural
Mediterranean basin (total)	486.1	164.3	249.8	130.4	49	21
Northern and eastern Mediterranean	317.4	87.9	192.6	92.8	39	−6
Southern Mediterranean (North Africa)	168.7	76.4	57.3	37.6	66	51

Source: World Development Indicators (WDI) (2014)

(which includes 23 countries[3])—and have a population of nearly 169 million (2012), a third of the total population of the Mediterranean region (see Table 1). The SM comprises three large countries, Algeria (alone almost four times the size of France), Egypt, and Libya. Egypt has the highest population followed by Algeria and Morocco, with high concentrations in urban/coastal areas (or along the Nile in the case of Egypt[4]), in higher altitudes, and in areas with favorable climate. Economic inequalities persist between the regions within countries due to past policies with a strong urban bias and historical concentration of wealth in economic centers located in coastal areas. Significant differences in economic and natural resources exist across the countries in the subregion. Algeria and Libya rely on rich oil and mineral endowments, while the other three countries are more dependent on agriculture.

The subregion is characterized by an arid climate with highly variable agricultural production. It has strong trade linkages with the Northern and Eastern Mediterranean, but investment in agriculture remains low, with lower productivity and capital intensity compared to Northern Mediterranean countries. This chapter provides a brief overview of the economic and demographic characteristics of the SM region, identifies the major challenges for food security and related problems, and proposes areas of priority action to tackle food insecurity.

2 The Southern Mediterranean/North Africa

2.1 General Characteristics

The countries of North Africa are all considered middle income countries with GDP per capita varying from about US$6,000 in Libya to US$3,000 in Morocco. The percentage of the total population living in rural areas has increased in absolute

[3] Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Portugal, Slovenia, Spain, Syria, Tunisia, Turkey, West Bank, and Gaza.

[4] 95 % of Egypt's population lives within 12 km of the Nile and half of the population lives in the Nile delta (UNDP 2009).

Table 2 Evolution of total and rural population in North African countries

	1960	1960 Rural population (% of total)	2012	2012 Rural population (% of total)
Algeria				
Total population	11.3		38.5	
Rural population	7.8	69 %	12.0	31 %
Egypt				
Total population	27.9		80.7	
Rural population	17.4	62 %	46.1	57 %
Libya				
Total population	1.4		6.2	
Rural population	1.0	71 %	1.3	21 %
Morocco				
Total population	12.4		32.5	
Rural population	8.7	70 %	13.4	41 %
Tunisia				
Total population	4.21		10.8	
Rural population	2.6	62 %	3.6	34 %
Total				
Total population	57.3		168.7	
Rural population	37.6	65.7 %	76.4	45 %

Source: FAOSTAT

Table 3 Economic and demographic indicators (2012)

	Population (total) 2012 (million)	Population (rural) 2012 (% of total)	Annual pop growth rate 2012 (%)	GDP/cap (current US$)	Agriculture value-added (% GDP)	Employment in agriculture (% of total)	% female of economically active population in agriculture
Algeria	38.5	31.1	1.9	5,272	9.9	25.7	52.6
Egypt	80.7	56.9	1.6	2,973	14.5	29.2	40.6
Libya	6.2	22.1	0.8	5,685	n/a	n/a	73.3
Morocco	32.5	41.3	1.5	3,044	14.4	39.8	48.7
Tunisia	10.8	33.7	1	4,305	9.2	16.2	32.9
Total	168.7	44.1			11.8		45.1

Source: FAOSTAT and World Development Indicators (WDI) (2014)

numbers but has decreased considerably in recent decades in terms of percentage of total population. Population living in rural areas represents nearly a third of total population on average with the exception of Egypt where more than half of the population lives in rural areas (Table 2). The majority of the rural population of North Africa is engaged in agriculture and farming involved directly or indirectly. Agriculture is an important economic and social plan in the subregion employing more than a quarter of the population in the countries of the region, with a high concentration of females (Table 3).

Table 4 Migrant remittances (receipts), US$ current (millions)

	1989–1991	1999–2001	2009–2011
Algeria	310	750	2015
Libya	–	9.5	17
Morocco	1778	2453	6591
Tunisia	509	828	1965

Source: UNCTADstat

As in many developing countries, the subregion is characterized by continuous population growth, despite a slight decline in recent years; the growth rate tends to be higher than in other regions. The proportion of youth in the population of the region is significant, ranging from 25 to 28 % (Population Reference Bureau), and their integration into the labor market is increasingly difficult. The population of the region has more than doubled in the last five decades (Table 1).

The share of agriculture in GDP has declined steadily over the years. Even in Morocco and Egypt, where agricultural activity is most important, it represents less than 20 % of GDP. Agriculture, however, still employs a significant share of the subregion's population and is the main source of employment in rural areas, particularly for women who represent between half- and nearly three-quarters of the economically active population in agriculture in most of the countries (it is only in Tunisia, where the proportion of women in the agricultural labor force is about 30 %) (Table 3).

The population of migrants from the region is numerous and accounted for about 10 % of the total population of the Maghreb[5] in 2010. Remittances from migrants have a fairly significant economic impact for the countries of the subregion. Despite the global economic environment, remittances have continued to increase in recent years. In 2011, migrant remittances accounted for 7 % of the GDP of Morocco and 4 % in and Tunisia accounted for approximately US$10.6 billion in average for the period 2009–2011 (Table 4).

2.2 Agriculture and Natural Resources

The SM region has a diverse resource base but faces constant pressure from population growth and national development activities—a situation that renders the countries very vulnerable to climate hazards. Much of the subregion is desert or semi-desert: between 75 % and 90 % of the territory of Egypt, Algeria, and Libya, the proportion of agricultural land is low (less than 10 % in Libya and less than 5 % in Egypt), while in Morocco and Tunisia, it is over 60 % (Table 5).

[5] Algeria, Libya, Morocco, Tunisia.

Table 5 Agriculture indicators (2012)

	Agricultural land (% of total)	Area equipped for irrigation (% of total agricultural area)	Arable land with permanent crops (% of total agricultural area)	Value added in agriculture (% GDP)
Algeria	17.4	1.4	20.4	6.9
Egypt	3.7	100	21.7	15.5
Libya	8.8	3.0	13.2	1.9
Morocco	67.3	4.9	30.1	15.1
Tunisia	63.0	4.5	50.4	8.8

Source: FAOSTAT

Table 6 Renewable water resources per person (cubic meters/year)

	1963–1967	1983–1987	1998–2002	2008–2011	2011 (% of 1963)
Algeria	976	528	382	331	32
Libya	369	157	115	95	23
Morocco	2,174	1,302	1,008	912	39
Tunisia	992	631	481	438	42

Source: United Nations Environment Programme (2013)

Agriculture continues to occupy a prominent place in the countries of the SM both at the level of its value-added in GDP, employment, and exports of goods (the participation of agriculture varies depending on the existence of exports of petroleum and energy products or not). Agriculture is also important in its role in rural development, environmental protection and regional balance. The agricultural sector is a refuge sector in rural areas: it provides many jobs to rural people, it is the main source of income, it contributes greatly to the preservation of the environment, and it is a catalyst for development.

Because of the arid climate, irrigation is an essential factor in productivity, but despite numerous projects the share of irrigated agricultural land does not exceed 5 %, between 1 and 3 % in Libya and Algeria (Table 5). The Maghreb countries enjoy a variable climate with higher altitudes and rainfall and rely on dryland agriculture to a large extent, while agriculture in Egypt is 100 % irrigated. Water resources are constantly and rapidly declining due to population and economic growth, and the subregion suffers from severe water stress with an estimated water supply of less than 500 m^3 per capita except for Morocco (Table 6). This lack is compounded not only by recurrent droughts that severely affect the region but also by the pressure on water resources coming from large-scale industries of agricultural and animal products. Adaptation to water scarcity include many projects but success is limited due to weak capacity of institutions and resource planning, and efforts for better management of water have produced only limited effects so far.

Along with water scarcity and desertification, there are also problems such as deforestation and rangeland degradation, especially important for the region, given

Table 7 Value of livestock production as percent of total value of agricultural production in North Africa (2011)

	Value of livestock production (as % of total value of ag. production)
Algeria	36 %
Egypt	42 %
Libya	40 %
Morocco	44 %
Tunisia	22 %

Source : FAOSTAT

the importance of the livestock sector in all these countries. The livestock sector has a diverse agricultural ecosystem and a unique geographical position, two key factors for the development of this sector. Livestock plays an important role in the Maghreb economy where it represents more than a third of the value of agricultural production and contributes the fight against poverty as a source of employment and cash incomes for rural farmers. Structural problems also arise, such as the fragmentation of farms (average farm size is around 10 ha in Tunisia and Algeria, and Morocco over 70 % has less than 5 ha). Finally, fisheries and forests provide badly or insufficiently exploited potentials (Table 7).

3 Challenges and Problems Related to Food Security

Although differences exist among the countries of the SM regarding economic and social conditions and resource endowments, they share the same challenges in ensuring food security of their populations, including (1) scarce and fragile natural resources and climatic hazards (2) high rates of growth of the population with a particularly young population (3) a decline in public investment and weak private investment in agriculture and rural development.

These challenges are at the root of the problems that the region must address to improve the performance of the agricultural sector as a step toward improving food security. Main problems to overcome are high rates of import dependency, low levels of agricultural investment, and addressing the problem of a growing young population with increasingly older population in rural areas. Low productivity and high variability of agricultural production comes largely from heavy reliance on systems based on rainfall. In addition, limited investments in agriculture have kept the limited agricultural performance with much lower yields than other regions. These problems related to production accompanied by a change in cereal demand structure in the last two decades (increased demand for grain for feeding livestock) increased the gap between supply and demand of cereals, resulting in heavy dependence on imports to meet domestic demand.

3.1 Dependence on Food Imports

Figure 1 depicts the evolution of demand for four staple crops in the SM region against production. The annual variability of production is quite pronounced, and the gap between total demand and production has continued to increase.

Cereals are staple food in North Africa. The proportion of energy intake from cereals, roots and tubers is about 55 % (FAO 2013). As incomes increase, the share of cereals is expected to decline, but continue to be important in the local diet. Increasing urbanization and changes in dietary practices will also mean an increase in demand for cereals, particularly for feed. The countries in the region are heavily dependent on imports, particularly cereals. Import dependency[6] ratios are high compared to the rest of the Mediterranean countries, ranging from 93 % in Libya to 40 % in Egypt (Table 8).

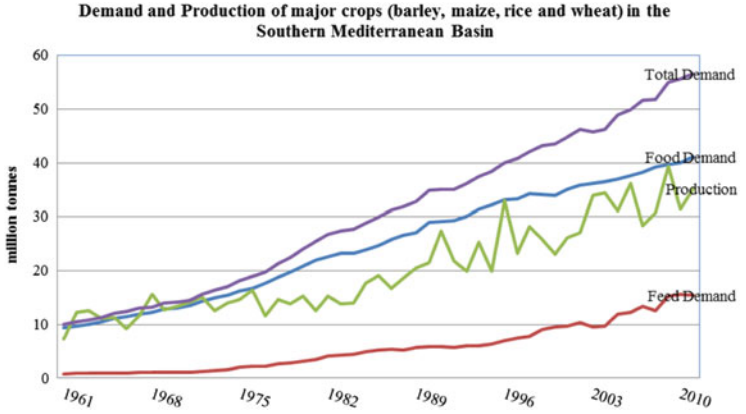

Fig. 1 Production and demand for cereals 1960–2011. Source: FAOSTAT

Table 8 Import dependency ratios, North Africa and the Mediterranean basin

	Import dependency ratio (%) 2008–2010
Algeria	66.1
Egypt	40.4
Libya	92.7
Morocco	47.4
Tunisia	54.4
Southern Mediterranean	49.6
All Mediterranean	33.1
North and eastern Mediterranean	26.1

[6] Defined as Cereal Imports/(Cereal Imports + Cereal Production) – Cereal exports.

Because of their extreme dependence on imports of food, agricultural and food trade balance of the SM countries is heavily in deficit. Libya and Algeria are most concerned, although they face less of a fiscal constraint compared to other countries. Cereal imports accounted for 32 % of all agricultural imports in the subregion in 2010. In the longer term, Morocco is the only country where grain imports are expected to decline in the next 20 years due to existence of opportunities for extension of cereal acreage under irrigation.

The North African countries are price takers and therefore exposed to substantial risks in terms of prices and quantities arising from strongly fluctuating import quantities and prices. The vulnerability is measured as a combination of exposure to risks of prices and quantities, and given that the SM countries all have high import dependency with substantial fiscal deficits, which exposes them to risks in terms of quantity and price.

The level of economic integration in the subregion is low. Intra-regional trade accounted for only 2.4 % of imports and 8.6 % of food exports in 2011, with the exception of trade between Tunisia and Libya (51 % of intra-regional food trade). This is explained by the complexity of procedures (average of 8 documents are required to import procedures and 7 for export for North African countries except Libya), the continued presence of barriers to trade the poor performance of some sectors, the relatively limited diversification of production and exports, and the lack of infrastructure and lack of complementarities between the agricultural sectors.

3.2 Insufficient Resources Allocated to Agriculture

Agricultural investment in the region in the past was driven by public investment with most of these investments in large projects. Countries in the region have made measurable progress in agricultural productivity and overall growth in the agricultural sector. However, agriculture still lags behind other regions in terms of productivity. Agricultural productivity in the countries except Libya has improved significantly, but remains well below the values of developed countries including the European Union. A sustainable improvement in agricultural productivity is possible and necessary given the untapped potential for sustainably improving agricultural production.

Data on capital stock show that in the countries of the region capital stock is mainly composed of land (51 %) and livestock (26.1 %) and less by the infrastructure, tools, machinery, and buildings (Table 9). The countries in the region have limited investment in agriculture, the mainstay of the evolution of agricultural productivity and performance. Investment in agriculture in the North Africa was down by 77 % during the period 1980–2007 and continues to represent a small portion of the value of the sector in GDP.

Ideally, most of the investment in agriculture should be from private sources and in most cases from farmers themselves. Data on private investment in agriculture is

Table 9 Capital formation in North Africa

	Capital formation (million US$ constants 2005)	Livestock (as % capital formation)	Machinery and equipment (as % of capital formation)	Structures for livestock (as % of capital formation)	Land development (as % of capital formation)
Algeria	14,545.2	28.8	15.8	1.4	42.0
Libya	7,531.4	15.4	11.1	0.5	64.6
Morocco	26,006.2	22.9	3.7	1.2	63.2
Tunisia	10,303.7	19.2	10.5	0.9	40.5

Source: FAOSTAT

rather scarce and hard to value, though many countries have revised their investment policies to enable more private investment in agriculture.

Historically, public investment has been the most important source of resource for the agricultural sector; however, in the past 10 years, private agricultural investment in relative terms has become more important. The agricultural sector in the countries receives special support, and government expenditures remain an essential element for the economic and social development. The agricultural research and extension, infrastructure and utilities, response measures against transitory shocks, programs to facilitate the adjustment of certain sectors or regions and enable innovation at risk for an environment sustainability, and food security are some of the features that continue to be applied to the public sector, more and more frequently in a decentralized manner and in partnership with the private sector and civil society (FAO 2014).

The extent of support and the instruments differ from one country to another, ranging from financial assistance (income support for farmers) or price supports to agricultural loans or granting of an investment premium. The expenses also vary from 1 year to another. The forms of taxation adopted by governments also have an impact on the level of available resources, while constituting an effective instrument for redistribution.

The share of expenditure on agriculture should reflect, at a minimum, the share of agriculture in the overall economy. While data on public spending for agriculture are scarce and not comparable, available data show that in many countries allocation of public spending does not reflect the economic or social importance of the sector. By taking data on the share of agriculture in GDP and compare it with total expenditures, it is possible to establish an agricultural orientation index indicating the extent to which public spending on agriculture match (or not) the importance of agriculture in the overall economy. To calculate this index, the share of agricultural spending in relation to total public expenditure is divided by the share of agriculture in GDP. The higher the index, the higher the share of agricultural spending is close to the share of agriculture in GDP.

For example, in Tunisia public spending on agriculture decreased over time as a percentage of total expenditures. The orientation index decreased by 0.39 in 2001 to 0.31 in 2011 (Table 10).

Table 10 Agricultural orientation index (Tunisia)[a]

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Orientation index[a]	0.39	0.34	0.40	0.43	0.40	0.41	0.38	0.33	0.35	0.32	0.31

Source: FAOSTAT

[a]Agricultural orientation index: Share of agriculture in total expenditures/share of agriculture in value-added

In most of the countries covered, historically public investment in agriculture was primarily oriented towards the mobilization of natural resources (water, soil, forests, fisheries to assist in preparing the conditions for sustained agricultural development (including through private operators) that would achieve the strategic objective of food security. Investment in research and development has been no more than 2–3 % of all agricultural investment (FAO 2014).

4 Achieving Food Security in the Long Run

Following the hike in prices of agricultural commodities (including grains and oilseeds) in 2007–2008, agriculture and food security have become important, not only the recognition of the negative impacts on the poorer urban populations facing increases in cost of food but also in fostering interest in agriculture which fueled agricultural investments. While there has been substantial increase in investments, the impacts of the food price hikes in the region have been more negative than positive. At the same time, political upheavals in the region have slowed down economic growth in Tunisia, Libya, and Egypt, severely affecting the ability to pay for increasing cost of imports. While prices are no longer on the increase, it is the volatility of prices that have the most devastating impact on the poor. The major threat to food security in the region is the vulnerability at national and household level due to price volatility of imported foods.

In developing a medium-term vision for the agriculture sector, the countries of the region themselves have revised their agriculture and rural development policies in an effort to take steps to sustainably improve agricultural productivity and farmers' income; access to these technologies, means of production, and the market; conservation, improvement and sustainable use of natural resources; adaptation to climate change and prevention of its adverse effects; and improving food security in subregional level.[7] Capacity building and improved management of natural resources and special emphasis on rural development and youth appear as clear priorities.

Opportunities should be explored, particularly in fisheries and livestock and other high value products such as olive oil. With the extent of the coastline in the

[7] Plan Maroc Vert in Morocco and Agriculture and Rural Renewal Strategy in Algeria.

Mediterranean and the Atlantic Ocean, the SM countries have an important fishing potential, both in quantity and quality, plus aquaculture resources. In Morocco, in particular, the fisheries sector accounts for a significant share of GDP and especially agricultural exports. This potential can contribute substantially to the economy of the country as well as improve food security and employment, with due consideration of the wide ranging institutional, legal, economic, and social impacts of fisheries activities.

In sectors such as olives and olive oil, dates, and other fruits and vegetables, there is much room for improvement, not only in terms of production but also in marketing and distribution.

Over the past two decades, governments in the region have also adopted agricultural market deregulation and reduction of price distortion and giving a greater role to the private sector in economic activities. These measures, although necessary, are not always sufficient to induce the investment needed to improve productivity and increase production. In order to stimulate investment in agriculture, transparent and functioning markets, access to finance and extension, and an appropriate legal and regulatory framework are needed. More generally, political stability and strengthened institutional framework are necessary to ensure adequate private investment. Strong complementarity between public and private investment is also essential to support agricultural growth, and governments need to invest in areas with significant public interest—research, extension and infrastructure (including water control, roads, storage facilities, and marketing), education, standards, and rules.

Improving food security requires efforts not only on the part of the countries themselves, but through regional and international actions.

Actions toward improving food security in the region need to focus on three key areas of action:

- National level
  - Sustainable improvements in productivity (inputs, technology, extension)
  - Promoting efficient supply chains (reduce waste, better logistics)
  - Targeted safety nets for the vulnerable populations
  - Better management of risks associated with high import dependency (food reserves, futures contacts)
  - Improving employment prospects in agriculture, particularly for the young
- Regional Level
  - Cooperation in policies affecting pricing of common resources
  - Cooperation in harmonizing trade policies
  - Strengthening infrastructure in the region
  - Improve market information systems and coordination of action to respond to world market volatility
- International Level
  - Countering market volatility through new financing mechanisms

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